Electronic
Systems
Division

②

Business Opportunities Guide

DTIC
SELECTE
DEC 0 5 1989
S   D
D

BEST
AVAILABLE COPY

A Winning Spirit

DEPARTMENT OF THE AIR FORCE

HEADQUARTERS ELECTRONIC SYSTEMS DIVISION (AFSC)

HANSCOM AIR FORCE BASE, MASSACHUSETTS 01731-5000

OFFICE OF THE COMMANDER

2 8 OCT 1987

To foster a spirit of open and effective competition, I am happy to present the second Electronic Systems Division Business Opportunities Guide. We remain committed to providing industry the best information possible on pending ESD acquisition programs. Your feedback on how we're doing is always welcome.

MELVIN F. CHUBB, JR.
Lieutenant General, USAF
Commander

ELECTRONIC SYSTEMS DIVISION
BUSINESS OPPORTUNITIES GUIDE

The complex Command, Control, Communications (C^3) systems necessary for tomorrow's Air Force can only be developed by a strong ESD/industry team. Our first Business Opportunities Guide was designed to strengthen that team by maximizing information flow between ESD and industry. We are gratified with the tremendous success of the Guide. Many thanks to those of you who commented on it. As you know, our business is dynamic and our Business Opportunities Guide must be likewise. Thus, the revised and updated Guide that you have before you. Once again, we eagerly solicit and welcome your feedback.

The vast expertise accumulated by the ESD/industry team in such international successes as the AWACS will face new challenges in the future. Near-term programs such as Joint STARS, JTIDS, and ADDISS will severely test our ability to develop, acquire, and field increasingly complex C^3 hardware.

For the next 20 years, ESD's central focus will be battle management. The Strategic Defense Initiative (SDI) and Air Defense Initiative (ADI) will involve massive amounts of data from vast sensor networks. The software to collect and display this data for the commander, in a form that is understandable, will be the key to how well SDI and ADI work. Knowledge based systems will dominate most of our future programs.

Not only what we do, but how we do it will be extremely important. Management of systems acquisition will not become easier; however with ESD and industry as partners, we can achieve our goal of making the systems acquisition process more responsive.

TABLE OF CONTENTS

HOW TO USE THIS GUIDE

It's simple. If you see a program that interests you, contact the program point of contact (POC).

We've compiled this guide to promote industrial participation in ESD procurements. We want to increase effective competition at the prime and subcontract level. By advocating competition in appropriate circumstances, we hope to get the best product for a fair and competitive price.

ESD's business is electronics, and we've broken this Business Opportunities Guide up into eight areas: Strategic Programs, Tactical Programs, Strategic Defense Initiative (SDI), Air Defense Programs (ADI), Intelligence and C^3CM Systems, Foreign Military Sales, Other Systems, and Technology Programs.

As you inquire about individual projects in this book, you may find that some procurements have passed beyond the point of solicitation release. In such cases, information other than that contained in the solicitation will be strictly limited to prevent undue competitive advantage.

For information on contracting opportunities, you may contact ESD/PKY, Competition Advocacy, Hanscom AFB, MA 01731-5000; telephone (617) 377-2621. If you wish to be placed on our annual mailing list, please submit your request in writing to ESD/PKYC, Mr. John Wilder, Hanscom AFB, MA 01731-5000. Also, we'd like to hear your comments on the format and content of the Guide so that our future efforts may reflect what you, the user, need.

HOW WE WORK

Most of our projects begin with the identification of an operational need or deficiency. They are first assigned to a System Program Office where engineers and other specialists explore and develop the various alternatives available, and define a general concept and specifications to meet the requirements of all agencies involved.

These specifications are then sent to industry as a Request for Proposal. Firms wishing to compete for the contract then generate specific designs or equipment to meet those specifications. These responses are carefully evaluated for technical merit, cost, capabilities and other factors, and one or more of the bidders are selected for the next phase.

If the program is large or complex, or involves substantial technical risk, the selected firms may be contracted to produce prototypes, engineering models, or schedule estimates. The best of those proposals then advance to engineering development and award of a contract for production. Projects which are less complex or involve little risk may proceed directly from proposal to production.

WHO WE ARE AND WHAT WE DO

Electronic System Division

Throughout history, no nation has been able to remain free unless it had the military strength to deter those who would conquer it. In our time, the elements of that strength -- missiles, ships, and aircraft -- have become so complex and costly that no nation, however wealthy, could provide them in overwhelming numbers without profoundly affecting its entire society.

The solution of this dilemma lies in the area of C^3 systems and equipment that permit limited military resources to be used with speed, precision, and effect. To the extent these systems improve our ability to detect an attack upon our nation or to control the skies over a battlefield, to the same extent, they will reduce the chance of a future world conflict.

This is the challenge -- and promise -- of C^3.

Since 1961, the Electronic Systems Division (ESD) of the Air Force Systems Command has been one of the major centers of C^3 technology in the free world. Located on Hanscom Air Force Base, some 18 miles northwest of Boston, Massachusetts, the Division is responsible for design, development, production, and deployment of C^3 systems and operates on an annual budget in the billion dollar range. If ESD were an industrial corporation, it would rank in the upper half of Fortune Magazine's listing of the 500 largest American corporations. Accomplishing this vital mission involves over 1700 professionals, including engineers, computer specialists, business managers, logisticians and contracting specialists, plus several hundred supporting personnel, both at the Hanscom facility and project sites across the United States and around the world.

ESD began it's extensive involvement in C^3 systems with Project SAGE (Semi-Automatic Ground Environment), which first integrated the nation's air defense radar network with computer-based command and control centers. SAGE was a tremendous breakthrough in technology. It's sophisticated early warning system was particularly valuable in light of the Russian's advances in Sputnik technology. It set the stage for automatic radar data transfer, enabled air defense to keep up with supersonic aircraft for the first time, and was the forerunner of the complex computer operations we take for granted today.

Other significant projects managed by ESD include the Ballistic Missile Early Warning System, the North American Aerospace Defense Command Combat Operations Center deep within Cheyenne Mountain in Colorado, and, most recently, the E-3 Sentry airborne warning and control aircraft, a highly instrumented airborne radar platform that can provide surveillance and control of aircraft for a wide variety of civil and military requirements.

Today, ESD is involved with projects that apply state-of-the-art technology. Among the many advanced programs under development are some that detect and track ballistic missiles; that provide battlefield commanders with real time intelligence from airborne electronic photographic reconnaissance; and that provide means of controlling access to sensitive areas. The purpose of all these systems is to provide processed information ... data that has *been* challenged for accuracy, weighed for reliability, filtered ot extraneous or irrelevant components, and integrated with data from other sources ... in a rational, coherent form that will permit the decision maker to exercise that most human faculty, judgement, quickly, efficiently, and intelligently.

STRATEGIC PROGRAMS

Strategic systems merit close scrutiny by Chief Executive Officers (CEOs) seeking to enhance corporate profitability in the face of accelerating competition in the DOD contracting arena. The 1980's are proving to be a decade of significant growth for strategic systems with everything from radar systems to command center software being upgraded or entirely replaced with new equipment. We are in a period of capital investment that offers many opportunities for technologically innovative companies.
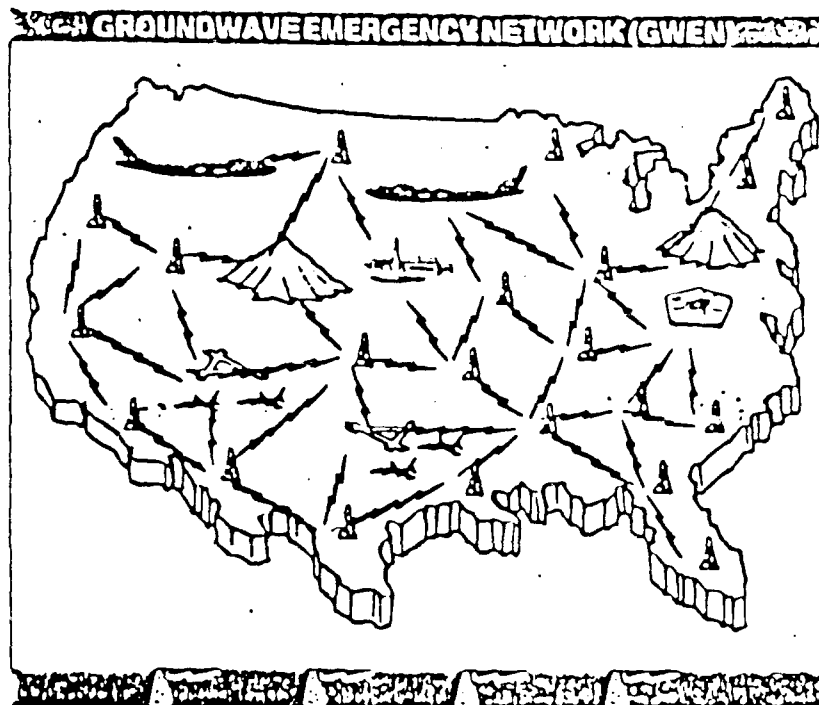
Mobile command centers for our strategic forces offer far-reaching technical challenges to those companies developing the communication and computer systems that will be integrated into these command centers. Inherent limitations on size, weight, and power, coupled with requirements that the mobile command centers perform the same functions as fixed facilities of greater size, create an incredibly demanding engineering environment for those companies working on these systems.

The World Wide Airborne Command Post - Replacement (WWABNCP-R) is ESD's program to meet these challenges. WWABNCP-R is the first program in nearly twenty years to provide comprehensive and revolutionary improvements to existing Air Force mobile command centers. The program will be developing both communication and battle management systems. Concepts in distributed processing and artificial intelligence are sure to play a key part in the success of this program. Will WWABNCP-R redefine the way commanders think about mobile command centers? That depends on American industry.

Deterrence is the heart of our nuclear strategy. Our deterrent capability depends upon reliable strategic communications. ESD is providing strategic communication for the Air Force in a number of programs. GWEN and AACE are two of these programs.

1

Ground Wave Emergency Network

Ground Wave Emergency Network (GWEN) is a low frequency (LF) network designed from inception to be resistant to the effects of electromagnetic pulse (EMP). From the technical perspective, GWEN is unique in being a highly distributed system, connected by omni-directional radio propagation, with multiple interactions among the nodal processors. A key element of the GWEN system is the receive only (R/O) terminal. This terminal, as its name implies, will only receive LF messages, it cannot transmit them. The effort to acquire both portable and fixed R/O terminals will begin soon.

GROUNDWAVE EMERGENCY NETWORK (GWEN)

The Aircraft Alerting Communications EMP (AACE) Upgrade system will provide SAC bomber bases with the ability to alert their aircraft despite the effects of EMP on electronic equipment. A subsystem of AACE is the AED, or AACE EMP Detection. This system consists of six primary elements which include: a nine loop sensor, an EMP hardened console, an operations interface and display panel, a system control unit, an uninterruptible power supply, and a field simulation unit.

Aircraft Alerting Communications
EMP Upgrade
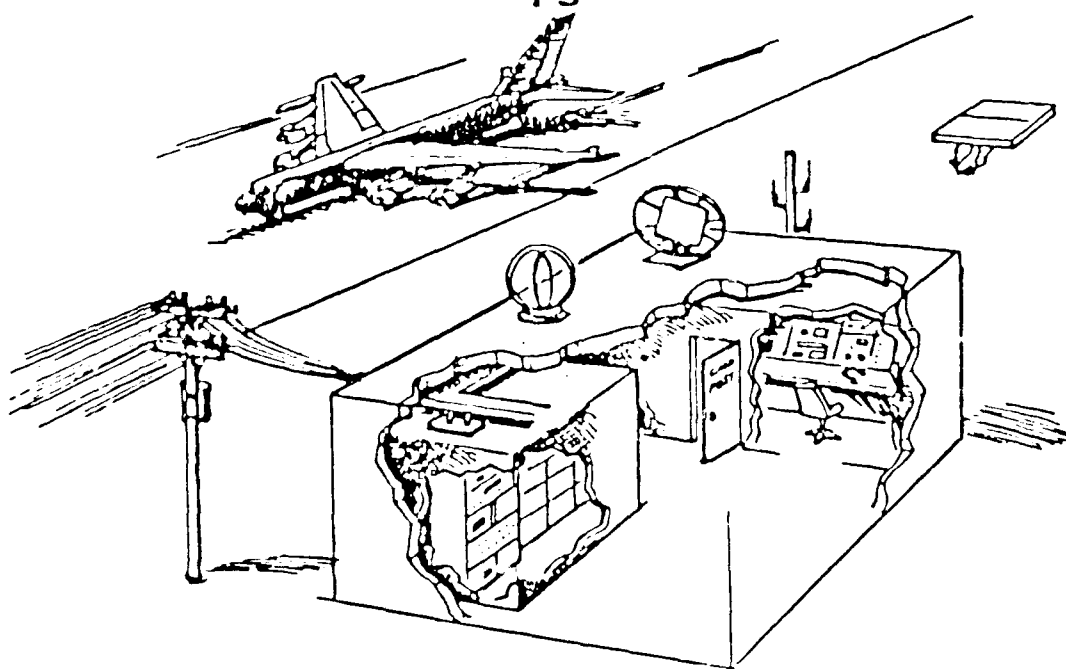
To find out more about these two programs, call Mrs. Barbara Lawrence at (617) 271-6288.

3

TACTICAL PROGRAMS

Theater warfare includes military action within a specific geographic area. It includes a wide range of possible conflict situations that require many kinds of warfare systems to defeat the enemy. The goal of theater forces is to achieve national objectives with the lowest appropriate level of force. The forces employed in theater operations must be able to operate within the defined combat environment. The mix of forces is influenced by factors such as the threat, political constraints, and the intensity of the conflict, as well as the missions to be performed.

ESD has many tactical programs developing equipment and technology for the Tactical Air Forces' inventories. These systems range from command and control facilities, radar and communications equipment, to the systems which provide physical security for them at home and abroad.

The Deputy Commander for Tactical Systems, JTIDS, and AWACS (TC) is responsible for the development and acquisition of new tactical C^3 systems for the Air Force and DOD. Most program activities involve other services and nations, and consist of command and control, communications and surveillance capabilities. Their objectives range from preserving current capabilities, in spite of major increases to the threat, through programs such as HAVE QUICK (HQ) and upgrades to AWACS, to applying technology to previously unattained military needs with programs like the Joint Tactical Information Distribution System (JTIDS).

The AWACS Radar Improvement Program will help keep the E-3A abreast of an increasing threat and technological advances since AWACS came on line. A new Surveillance Radar Computer (SRC) will replace the existing Radar Data Correlator (RDC) and Digital Doppler Processor (DDP); a new Surveillance Radar Computer Program

(SPCP) will replace the existing SRCP; and an Improved Radar Control and Maintenance Panel. The SRC will have greatly improved processing speed and memory capacity with the same power, weight, and volume constraints as the current cabinet housing the RDC and DDP. Planned improvements will markedly enhance detection performance and provide better electronic counter counter-measures. The SRC will be designed to allow for future growth in radar processing techniques. Further information can be obtained from Major Jerry Ryan, (617) 377-5397.
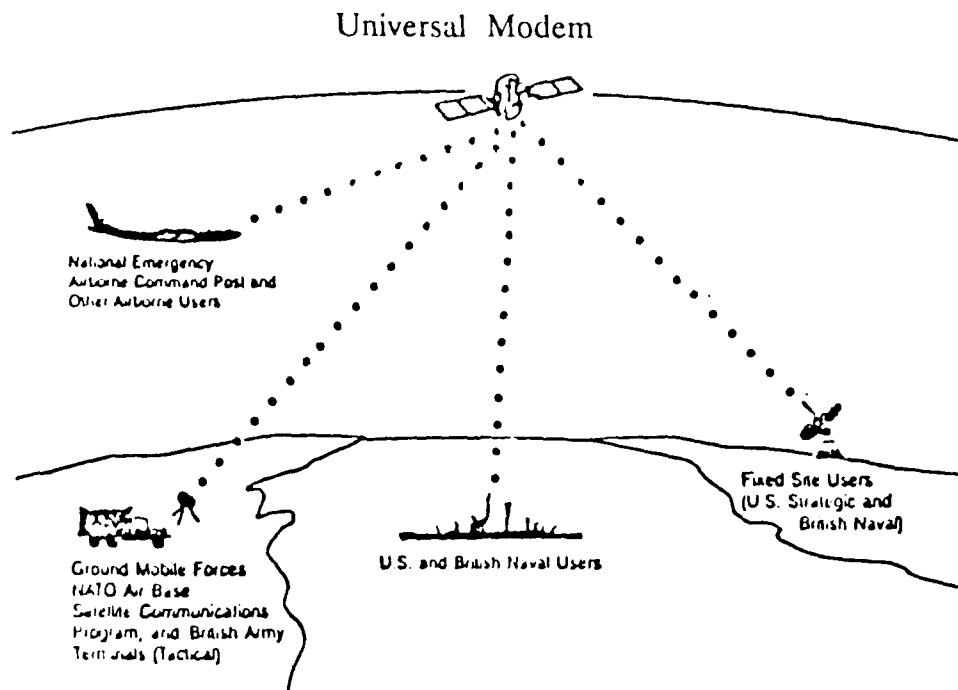
Within the JTIDS SPO, work is progressing on the Multifunctional Information Distribution System (MIDS) Program. This program, in Phase I, will determine the feasibility of producing a smaller version of the existing Class 2 terminal, while defining using nations requirements. Phase II would be a Full Scale Development effort. The MIDS terminal would be used primarily on tactical aircraft where space availability is often critical. The goal is to produce a 0.5 cubic foot terminal for both DOD and participating NATO countries, that will incorporate all the operational capabilities of the current Class 2 terminal. Additional information can be obtained from Major Joe Bisognano at (617) 271-3096.

The Advanced Tactical Battle Management (ATBM) program is designed to rapidly develop prototypes, and evaluate and field advanced tactical C^2 systems for the Tactical Air Forces. The objective is to coordinate separate, often command unique efforts involving research and development plus ongoing programs, to ensure maximum effectiveness, application and interoperability with minimum duplication. Efforts focus on Tactical Air Control Centers, Wing and Squadron Operations Centers, and Air Support Operations Centers (ASOC). The Air Support Operations Center upgrade work, jointly managed by the Deputy Commander for Development Plans and Support Systems (XR) and TC, will provide the Tactical Air Forces with an automated, mobile Air Support Operations Center to replace

the old and unsupportable equipment, and reduce manpower requirements. This effort is in the early stages of conceptual planning and requirements development. Captain Timothy Smith (617) 377-6079, XRS, and Mr Ken Pugh (617) 377-2795, TCR, expect the program to grow rapidly.

Two HQ radios are being developed by TC. The HQ IIA UHF Airborne Radio Set will replace the HQ II radios. These radios will be produced using a government supplied reprocurement package. The second replacement radio, HQ IIA UHF Ground Radio Set, replaces the AN/VRC-83 and AN/PRC-113 ground radios. The radio will be suitable for installation and operations in the AN/GRC-206 Radio Pallet and as a manpack. Information on both radios can be obtained from Mr. Dave Carstairs at (617) 377-4952.

Another effort to improve communications in a jamming environment is the AN/TRC-170 ECCM program. This program will upgrade the TRC-170 radio with a modem and auxiliary antenna anti-jam subsystem. The point of contact is Captain Ken Albert at (617) 377-8216.

Universal Modem

National Emergency
Airborne Command Post and
Other Airborne Users

Fixed Site Users
(U.S. Strategic and
British Naval)

Ground Mobile Forces
NATO Air Base
Satellite Communications
Program, and British Army
Terminals (Tactical)

U.S. and British Naval Users

A major improvement to future communications systems will be provided by the Universal Modem (UM). This program will develop a survivable modem for all super high frequency users and standardize waveforms for implementation in other modem developments. Lieutenant Colonel Richard Smart (617) 377-8208 can provide technical information on this program.

Captain Craig Gilbert, (617) 377-8191, heads up the Tactical Generic Cable Replacement (TGCR) Program to replace CX-4566 26 pair tactical metallic cable with a long range high-speed fiber optic transmission system. The lighter weight and ease of handling associated with fiber optic cable will greatly improve tactical communications mobility.

The Anti-Radiation Missile (ARM) Alarm Sensor Program will provide increased survivability for C^3 equipment and personnel collocated with AN/TPS-43E ground tactical radar, by providing an autonomous radar system capable of detecting approaching ARMs and initiating countermeasure defenses. More information can be obtained from Mr. Dave Johnson at (617) 377-8363.

Several air traffic control efforts are underway in TC. The New Mobile RAPCON Program, managed by Captain Jim Garcia at (617) 337-4824, provides terminal air traffic control services for US and allied tactical and contingency air operations. This radar system will be comprised of a number of major radar subsystems, communications subsystems, and ancillary subsystems. It will operate in a hostile ECM and Chemical Warfare environment, and must interface with other air traffic control systems.

The Tower and Surveillance Restoral Vehicles (TRV/SRV) Program will provide highly mobile, quick response, tower and IFF beacon air traffic control capabilities to meet critical wartime mission requirements in the European and Pacific theaters, in the event an air base's primary tower and surveillance capability is

destroyed. The point of contact for more information is Lieutenant Dave Burn, (617) 377-4938.

The Modified Commercial Microwave Landing System Avionics (C-130) effort is a separate development contract for modifications to existing FAA certified MLS commercial avionics (up to ten pre-production sets), to include three production options for approximately 600 sets of avionics for C-130 aircraft. Lieutenant Christopher Caldwell, (617) 377-4181, stated that the avionics will be commercial grade equipment with the capability for a computed straight-in approach to an offset collocated site using TACAN or other DME source.

The purpose of the Military MLS Avionics Program is to develop very high reliability MLS avionics for use by military aircraft of all the services that do not use commercial MLS receivers. Program manager for this effort is Lieutenant Cary Stokes, (617) 377-4181.

Mr. Alan Gabrielson, (617) 377-4181, is leading the Mobile MLS (MMLS) program. The MMLS will be a mobile, rapidly deployable all weather microwave precision approach and landing system. It will be light weight (less than 1000) pounds), modular in design, and will include antennas, electronics, and power supply.

Without proper safeguard, C^3 systems as well as other systems are potentially vulnerable to forces whose goal is to neutralize or destroy them. Several programs within TC are responsible for developing physical security systems to safeguard assets in the United States, as well as USAF and other DOD assets overseas.

The Weapons Storage and Security Systems (WS^3) under the direction of Lieutenant Colonel Doug Hill, (617) 377-6321, will fulfill the need for improved nuclear weapon storage. The system will

8

be installed in several locations throughout USAFE and PACAF.

A similar program is designed to provide security for Air Launched Cruise Missile (ALCM) weapon storage areas. The ALCM Intrusion Detection System (ALCM IDS) is under the management of Major Richard Eldard at (617) 377-6367.

The Perimeter Sensors Program headed by Lieutenant Colonel Ed Mills, (617) 377-6319, and the Annunciators Program under Major Eldard, (617) 377-6367, are designed to provide the next generation of command, control and display equipment to detect, assess, and manage possible intrusions, and the exterior physical security equipment for high priority, mission critical resources at Air Force bases worldwide.

The SCOPE SHIELD Program will replace hand-held radios currently used by Security Police forces, with over 11,000 portable radios and 2,000 base stations capable of multiband operations, voice encryption, and increased available scanners. Security police teams may be compromising their intentions wherever they transmit on present radios.

Joint STARS

The Joint Surveillance Target Attack Radar System, an Air Force/Army program, is developing a side-looking phased array electronically and mechanically scanned antenna and multimode radar that will satisfy the services' need to detect, track, and transmit position data on stationary and moving ground targets in the first and second echelon. Radar information is transmitted from the airborne platform to the ground stations and other command, control, communications, and intelligence elements through secure data links. Colonel John Colligan, Deputy Commander for Joint STARS, is the point of contact for this effort. He can be reached at (617) 377-5725.
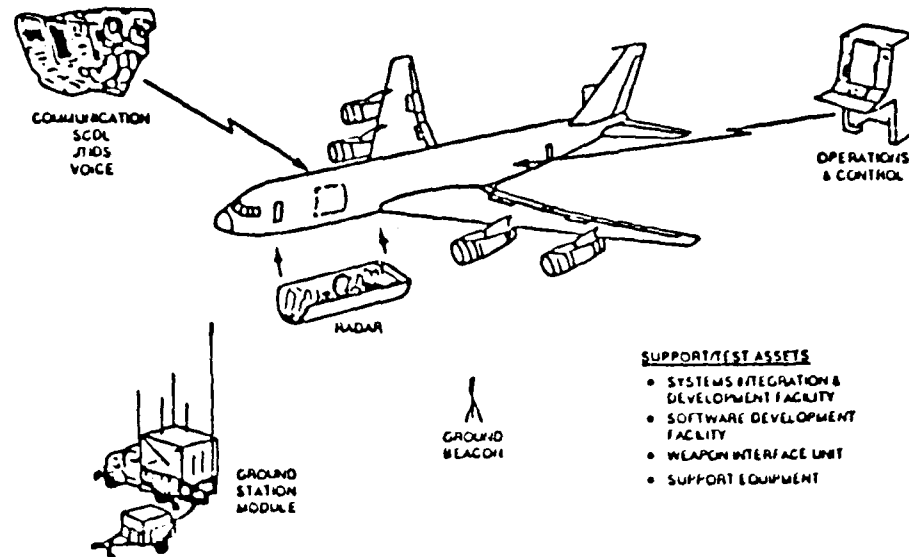
The preceding programs all support the tactical warfare mission area. ESD deputies are continually developing new programs and technologies to assist the Tactical Air Forces.

STRATEGIC DEFENSE INITIATIVE

On March 23, 1983, President Reagan offered a new challenge to the American people by calling for a national research program to investigate technologies that might someday make it possible to defend against ballistic missiles. The Strategic Defense Initiative (SDI) Program brings together these various technology programs in an effort to determine the feasibility of a system capable of destroying ballistic missiles in flight. Such defense systems could provide an alternative to reliance on offensive nuclear retaliation as the sole basis for strategic deterrence, and lead to the ultimate goal of enhanced stability by reducing the threat of ballistic missiles to the US and its allies.

The comprehensive SDI Program examines a wide range of technological concepts in three functional areas: sensors, to detect and track enemy ballistic missiles (and their warheads) after launch; weapons (both kinetic energy and directed energy), to intercept and destroy these missiles and warheads inflight; and Battle Management/Command, Control, and Communications (BM/C^3), to coordinate the interaction of the weapons and sensors and to provide human control of the overall system.

Of these three areas, the job of BM/C^3 is certainly one of the most challenging and most difficult. ESD is the lead Air Force Product Division for conducting research into BM/C^3 concepts associated with space-based ballistic missile defenses. The goal of this research effort is to define and evaluate efficient, survivable, and cost effective BM/C^3 architectures which will integrate vast numbers of space-based weapons and sensors into a coordinated, effective ballistic missile defense.

ESD is answering this challenge through its Strategic Defense Initiative Program Office focusing on two key areas. First, work on BM/C^3 architectures and proof-of-concept simulations

11

will help define detailed concepts associated with implementing a boost-phase strategic defense system. Second, the National Test Bed Program will interconnect a range of geographically distributed research facilities, simulation centers, and test ranges to test, demonstrate, and validate technologies and concepts under consideration.

SDI BM/C^3 Experimental Version Program

The SDI BM/C^3 Experimental Version Program, managed by Lieutenant Colonel Thomas Oldenburg, (617) 271-3980, will develop a large-scale distributed simulation which demonstrates feasibility of the subsystems and components associated with a specific Battle Management/C^3 architecture. This simulation, called an experimental version, will focus on BM/C^3 complexities, demonstrate solutions to those complexities in a systems context, and support BM/C^3 technology insertion via hardware-in-the-loop, software-in-the-loop, and human-machine interfaces. Upon completion, this experimental version will operate in the National Test Bed environment. A Request for Proposal was issued in early June 1987 for a competitive 15-month design and prototyping phase. Contract award is anticipated this fall, with a follow-on implementation phase anticipated in early 1989.

SDI Concurrent Processing Experiments

The SDI system will require powerful computer processors capable of performing millions or billions of calculations per second to support BM/C^3 algorithm execution within critical engagement timelines. As one approach to achieving high-performance processing, ESD's SDI program office is analyzing key BM/C^3 computational requirements in a concurrent processing experiment program conducted through the California Institute of Technology's Jet Propulsion Lab. The objectives of the current program are to demonstrate the applicability of advanced concurrent processing

12

to computationally intense BM/C^3 simulations. The POC for this experimental program is Lieutenant Ann Kuo, (617) 271-2952.
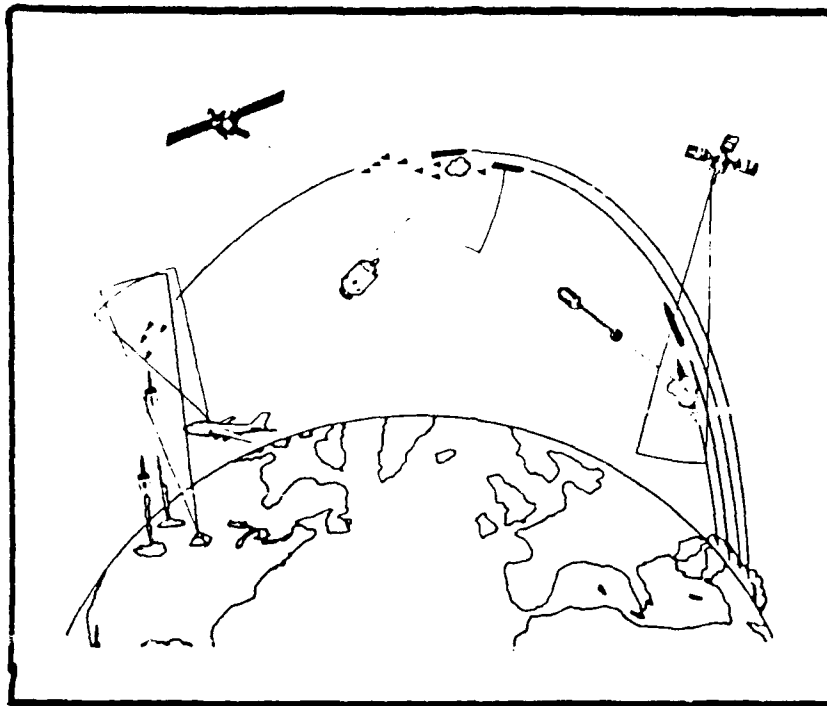
SDI Command Center Study

Without effective command and control, a ballistic missile defense system will be useless. Thus, the hub of an operational strategic defense system will be the Strategic Defense Command Center (SDCC). The SDCC will assess strategic defense options and operationc against the ballistic missile threat, to include planning, deployment, and execution of forces, situation assessment, and maintaining system readiness. ESD's SDCC effort will review candidate SDI architectures and define the functions and subfunctions to be performed in the SDCC, including concepts for displays, graphics, and work stations. The point of contact is Captain Dan Cvelbar at (617) 271-2889. A.D. Little, Inc. is performing the study which will produce a program plan and functional description by December 87.

SDI Satellite Command & Control Study

The SDI system as envisioned today will involve hundreds, possibly thousands, of satellites. Thus, revolutionary approaches will be required for satellite control. The SDI Satellite Command and Control Study, managed by Captain Tom Potier, (617) 271-3862, will analyze and study the existing capabilities for telemetry, tracking and control of space platforms, and will determine the evolutionary improvements necessary for more efficient C^3 and peacetime upkeep operations of an expanded satellite population. Appropriate experiments will be identified to test the study recommendations and conclusions.

SDI Human Factors Evaluation

Despite the tremendous role that automation will play in the SDI system, the human will remain the most critical element. Accordingly, ESD's SDI program office is examining human roles, activities, and tasks for potential impacts on SDI system performance. Included in this effort are human/equipment tradeoffs, and man-machine interface requirements and performance parameters. This effort, SDI Human Factors Evaluation, will also evaluate the timeliness of the decision processes, and the data display requirements for effective management of information. A major thrust of this effort will be to examine the operations of large systems previously acquired by the Government to learn what works, and what does not. The study will include an experimental and demonstration phase to prove the display and graphics concepts as they are defined. Captain Tom Potier, (617) 271-3862 leads this project.

SDI National Test Bed

The National Test Bed (NTB), managed by Colonel Thomas Leib, Jr (617) 271-3832 is a phased hardware, software, and facility

program with the goal of providing a comprehensive capability to compare, evaluate, and test (in a manner compliant with the Anti-Ballistic Missile Treaty) SDI system architectures (including Battle Management/C^3), as well as to test key defensive technologies in a system level framework. The center of the NTB will be the National Test Facility (NTF) at Falcon AFS, CO, which will control and coordinate a number of other geographically-remote research/simulation facilities which will be electronically interconnected to the NTF to provide a distributed test bed. The NTB will be a primary vehicle for supporting an SDI full-scale development decision in the early 1990's. Contract award is anticipated this fall.

SDI Distributed Simulation Experiment

The National Test Bed Program will require the use and coordination of geographically distributed computing centers from the three services, the national laboratories, and the contracting community. To mitigate risk in distributed simulation, the National Test Bed Joint Program Office (NTBJPO) has embarked on an experiment which will distribute an SDI simulation over three geographically separated, heterogeneous computing centers and operate that simulation using the Cronus distributed operating system (DOS) developed under contract for Rome Air Development Center (RADC). The experiment is ongoing and will give the NTBJPO early insights on questions concerning effective control of distributed simulation and DOS technology. Lieutenant Eric Bennett, (617) 271-3841, is the point of contract.

SDI Secure Video Teleconferencing

The (NTBJPO) is establishing a full-motion, secure video teleconferencing network to facilitate the management of the widely distributed organizations supporting the SDI and NTB programs. Plans call for nine Air Force, Army and Department

of Energy locations to be interconnected by the end of 1987, with additional DOD organizations and defense contractors to be added in future years. Features include standard and high resolution graphics, electronic whiteboards and writing tablets, and recording and audio add-on capabilities. Each site will have a conference room sized studio designed to accommodate up to 12 people. The teleconferencing network is being implemented through the Defense Communication Agency's Defense Commercial Telecommunications Network Program. Installation and integration contracts for the first nine locations have been awarded by DCA. Captain Herb Shirey, (617) 271-7237, is the project manager for this effort.

AIR DEFENSE PROGRAMS

The Air Defense Initiative (ADI) is a far-reaching program to develop technologies supporting an advanced air defense system for North America. The program is a Tri-Service effort, and ESD has been selected as the Air Force integrating product division, as well as lead product division for surveillance and command and control. This defense system must be capable of detecting, tracking, identifying, and negating all air breathing threats to North America beyond the year 2000. This effort will include specifying an optimized force structure through the System Integration contract and other efforts, as well as contracts to advance the state of the art in surveillance and engagement. Lieutenant Colonel David Herrelko, Deputy for ADI, is responsible for overall management of the ADI program.

In ADI Surveillance, the Air Force Program Office is moving along a number of paths, including airborne and ground based sensors. Last year, the program office published a call for innovative ideas in the field of North American Air Defense. From over one hundred responses, approximately one dozen contracts were awarded to explore such diverse areas as High Altitude Long Endurance Surveillance Platforms, and Neural Networks for target recognition. This aggressive, open minded approach continues today as ADI explores new ways to defeat the threat. Lieutenant Colonel Bill Lana, at (617) 377-6313, is the Director of ADI Surveillance. If you wish to discuss your methods of detection against heavy clutter, contact him for an appointment.

ADI surveillance involves more than studies and technology demonstrations. The program office is already pressing ahead with development of the Advanced Surveillance and Tracking System (ASTS). It will be the most powerful sensor suite ever mounted on an airborne platform. This radar will detect, track, and identify all air breathing threats to North America at long

range, and will start full scale development in the mid 1990's. Multiple contracts have already been awarded through RADC to begin development of a long range radar, including basic design and ground demonstration of critical technologies. The Air Force has also contracted for top-level system trades studies for this platform, to include defining the full sensor suite and command and control components. This effort, which comprises multiple six-month awards, will lead directly into one year more detailed system trades studies to be conducted by a somewhat smaller field.

In early 1988, the Air Force will issue a RFP for designing and building of Advanced Development Models of the ASTS. The contract will continue for approximately three years, culminating in a flyoff of the competing designs. A winner will be chosen to fully develop the ASTS and take it into production. Interested companies should contact Lieutenant Mike Francl at (617) 377-6029.

ADI Communications Systems Concepts
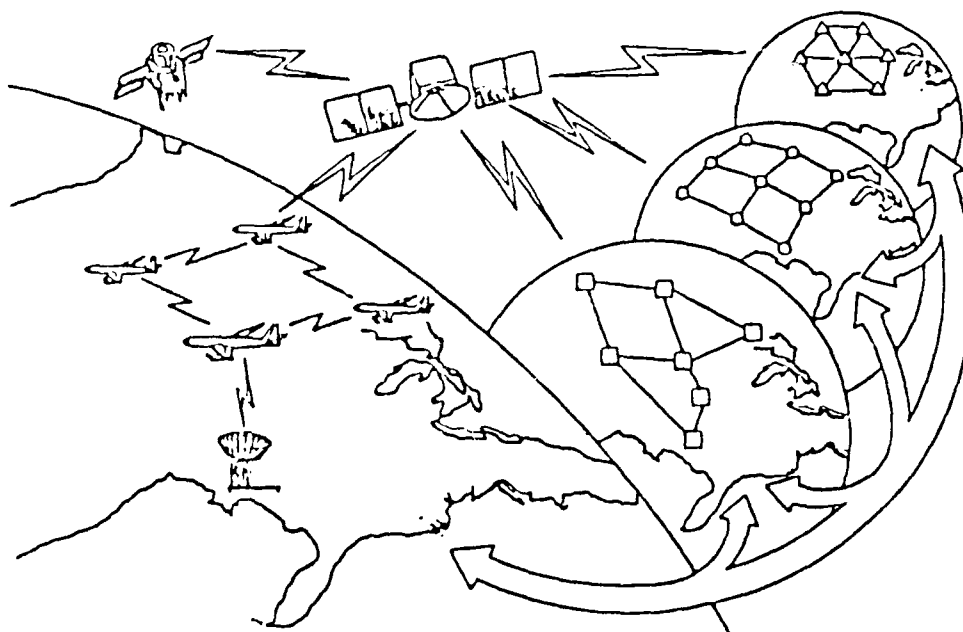
The Air Defense Initiative Command and Control Directorate is developing technologies and methods to direct air defense forces throughout all phases of conflict. The stressing requirements of survivable, highly reliable communications among far-flung units while under pinpoint attack, require advances in the state of the art in both force management techniques and communications. The Air Force is currently looking at dynamic, multi-media communications networking; fusion of data from diverse, widely separated sensors; decision support processing, including artificial intelligence; and continuously reconstitutable command and control. Interested companies should contact Lieutenant Colonel Paul Monico at (617) 377-6312.

The overall air defense system needs a final design goal to identify and pace the diverse ADI efforts in surveillance, C^3, and engagement. Work will begin soon to identify that point. The Air Force recently released a RFP to conduct System Integration studies which will provide ADI with an overall system of systems that would constitute a fully capable air defense system for North America. These multiple, one year studies which will assist the Air Force in formulating the overall system design goal, identify the most promising systems and technologies that will comprise that air defense system, and layout complementary development schedules to support them. Companies interested in this area should contact Major Barry Morgan at (617) 377-6477.

The Deputy Commander for Strategic Systems currently manages a number of large contracts for air defense surveillance and communications. To support this tremendous responsibility effectively, ESD/SYC-5 released a RFP in July 1987 for SETA support. The winning company will support the program offices in system engineering and general engineering support for the Over-The-Horizon-Backscatter Radar (OTH-B), the North Warning System (NWS), SEEK IGLOO, the FAA/USAF Radar Replacement Program,

POTEEN, and the Atmospheric Tactical Warning Connectivity Program. The contract is expected to be awarded in January 1988 under full and open competition. Interested companies should contact Captain Stephen Chimelski at (617) 271-5420.

The Iceland Air Defense Radar Network will receive major improvements over the next several years. The present Iceland Command and Control Enhancement (ICCE) and the Iceland Region Operations Control Center (ICEROCC) will be replaced with the NATO Iceland Air Defense System (IADS). Included in this effort are new three-dimensional radars with a range over 200 miles and a Control and Reporting Center/Communications (CRC/COMM). The Air Force will procure four radars, a control and reporting center and its alternate, and provide improved on and off island communications and interoperability. The contract will be awarded to a contractor from a NATO country, under NATO procurement procedures. The procurement will be conducted under a NATO infrastructure modified two-step procedure. The Air Force will release an Invitation for Bid (IFB) in December 1987, leading to a Firm Fixed Price (FFP) contract. Interested companies should contact Lieutenant Colonel Lee Cheshire at (617) 271-2576. Companies interested in learning more about the intricacies of NATO procurement methods should contact Mr. Ken Kinal at (617) 377-2172.

INTELLIGENCE AND C^{3}CM SYSTEMS

The Intelligence and Command, Control, and Communication Counter-Measures (C^{3}CM) Systems Deputate is responsible for developing and acquiring all Air Force systems dedicated to the assimilation and analysis of intelligence. Additionally, they're responsible for the acquisition of systems necessary for the Air Force to have an integrated C^{3}CM capability. They concern themselves with the full gamut of the Air Force mission, from systems used in training our intelligence analysts to those operationally engaged in exploiting multispectral imagery.

The focus of this deputate is far-reaching and intersects every Air Force mission area. In the command and control center arena, they're interested in systems to effectively manage our electronic combat capabilities, systems that are capable of fusing intelligence information from multiple sources into a cogent assessment of a situation or scenario being scrutinized, and systems that facilitate the rapid dissemination of intelligence data to the major commands (users). Under the auspices of C^{3}CM, the kinds of systems of interest relate to electronic warfare, signals collection, platforms and cover, concealment, and deception capabilities. Another major area of emphasis is the design, development, and acquisition of C^{3}CM and intelligence training systems.

The challenges facing this Deputate are many and by no means trivial. Domains of particular concern are the following: data fusion with complete or incomplete information, multi-level computer security, knowledge-based systems, real-time signal understanding, automated intelligence support to lower echelon units, real-time interpretation of enemy space missions, intelligent aids to augment the abilities of our intelligence analysts, and C^{3}CM applications for high powered microwave emitters. With continued emphasis on harvesting the fruits

of cutting edge technologies, this organization is, once again, demonstrating its commitment to fielding the best available technology in the shortest amount of time.
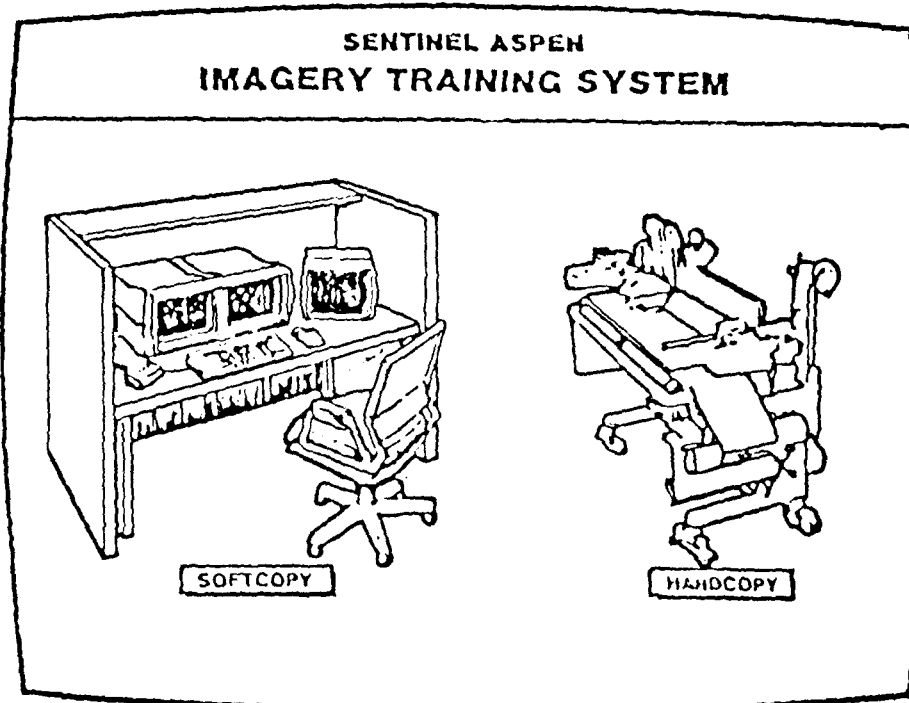

SENTINEL ASPEN

SENTINEL ASPEN is a two-phased program to modernize the intelligence training administered by the Air Training Command at Goodfellow AFB, TX. This effort will improve the training of analysts performing image interpretation and exploitation. The first phase concentrates on the improvement of both hardcopy and soft copy imagery intelligence training. Phase I is presently in full-scale development utilizing off-the-shelf hardware with contractor provided software. Phase II of the program is intended to improve the training of the intelligence analysts working in the fields of fusion, indications and warning, targeting, and air intelligence functions. Instrumental to the success of both of these efforts is the use of advanced Computer Aided

Instruction and Computer Managed Instruction to train the analysts and assist the instructors in the management of the overall program. An acquisition decision regarding Phase II hasn't been made. The point of contact for this program is Lieutenant Colonel Joel Renninger. He can be reached at (617) 271-2073.

SENTINEL BRIGHT I
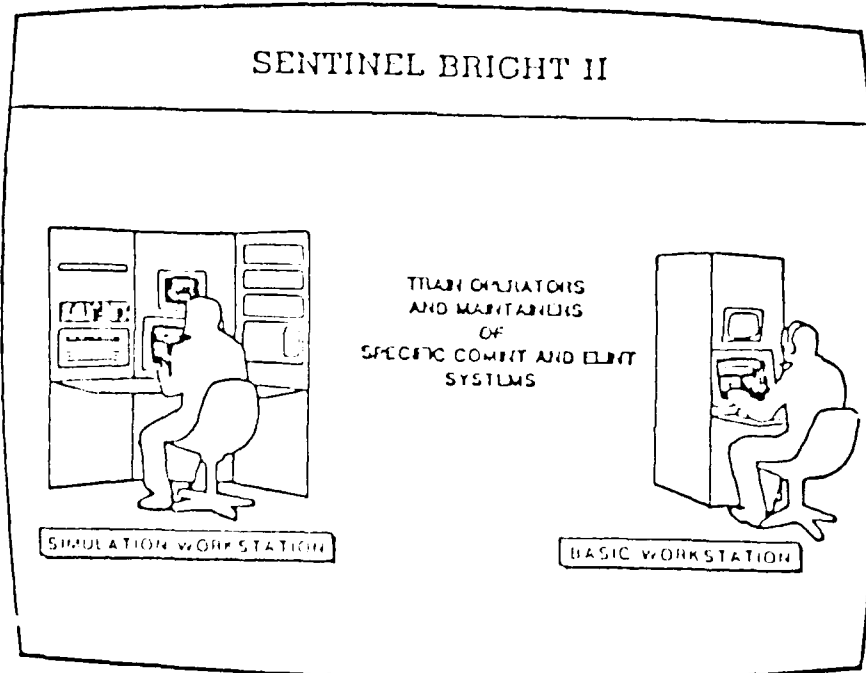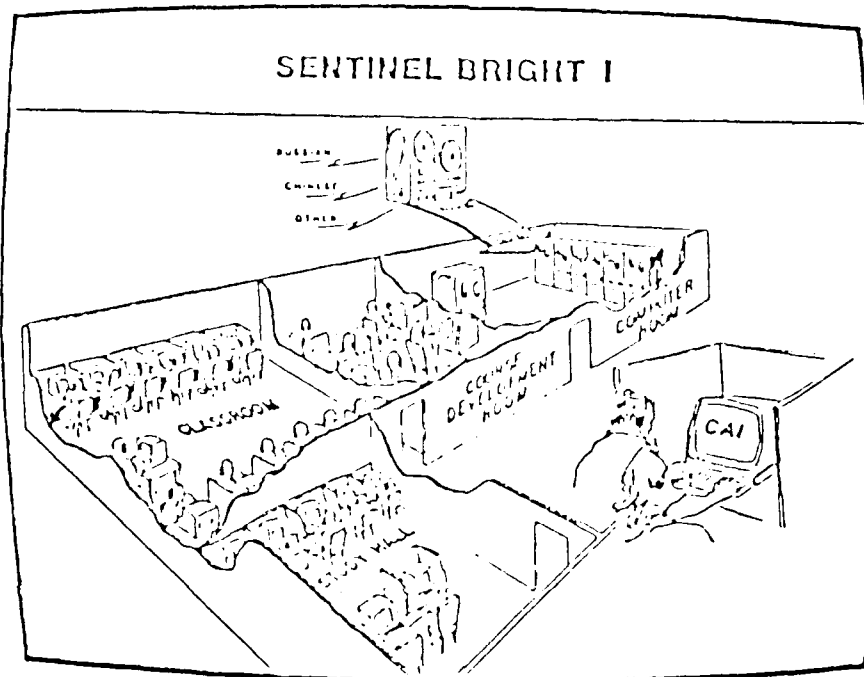
SENTINEL BRIGHT II

SENTINEL BRIGHT I AND II

The SENTINEL BRIGHT program is a two-phased effort to carry the training of our linguists, intelligence analysts, and maintenance technicians into the 21st century. The two distinct SENTINEL BRIGHT training systems are part of the government's Intelligence Training Consolidation Program. This program will bring together the training programs of all four services and relevant government agencies, at Goodfellow AFB, TX. The first phase consists of a computer driven, digital voice processing training system used for generic training of cryptologic linguists. The full system will consist of 460 workstations. They will be used to train approximately 3000 Service Cryptologic Element students per year for the modern operational cryptologic system in the field. Phase II of this effort, or CITS, will provide two subsystems of 388 workstations: the SCI Training System (SCITS) and the Collateral/Unclassified Training System (C/UTS). CITS will combine computer aided instruction with digitized voice processing, videodisk and graphics overlay, and simulation capabilities. The CITS will be required to train approximately 3000 students a year as cryptologic intelligence equipment operators, analysts, and maintenance technicians. The program manager is Mr. Ron Mason. Mr. Mason can be reached at (617) 271-7179.
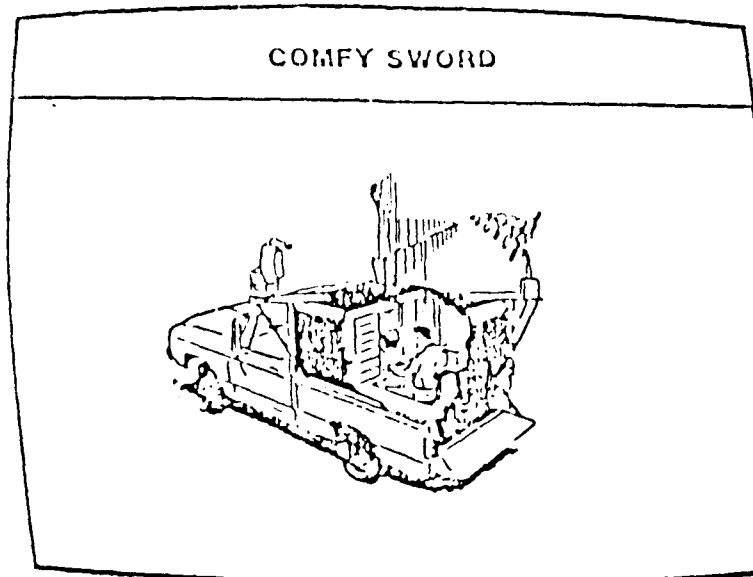
COMFY SWORD

COMFY SWORD

This is a ground-based jamming system for training aircrews in a hostile electronic countermeasures environment. The system will consist of four Multiband Jammers (MBJ), two Electronic Support Measures Stations (ESM), a Range Interface Unit (RIU), and a Central Control Station (CCS). Each MBJ will be able to cover the high interest bands of 20 MHz to 18 GHz. The ESMs will send target information to the MBJs. Each station will then be controlled by the CCS located at Nellis AFB, NV. The COMFY SWORD point of contact is Captain Richard Wise. He can be reached at (617) 271-7178.

Intratheater Imagery Transmission System (IITS)

The IITS is a system to interface the Tactical Digital Facsimile (TDF) to a variety of communications media, excluding Autovon. The primary communications medium is the Defense Data Network (DDN). The IITS will possess a store and forward capability, multiple transmission capability, and the ability to electronically store up to one day's traffic of images. The IITS program manager is Lieutenant Colonel Mike Gaydeski. He can be contacted at (617) 271-8084.

Intelligence Workstation (IWS)

The IWS is a sophisticated, modular, expandable, and less expensive successor to the present standard intelligence terminal. The IWS architecture is comprised of a standard IBM AT I/O bus, a NS 32016 CPU, a floating point processor, 1.2 MB floppy, 30 MB hard disk, 1 MB of RAM, communications controller board, keyboard, and a mouse. The operating systems will be UNIX System V and MS DOS with the following commercial applications software: word processor, spreadsheet, and a data base manager operating under a versatile window manager. Expandability has been

emphasized by providing up to twenty different hardware and software options. This program's point of contact is Lieutenant John Birch. He can be contacted at (617) 271-7050.

C^3CM ADVANCED SYSTEMS

The objective of this program is to coordinate the development and testing of concepts and technologies necessary for an integrated C^3CM capability. All efforts will be concentrated on identifying the voids in our present C^3CM capability and ensuring that technology is available to fill those voids. This program is divided into the following four major project areas: High Power Microwave, Battle Management, Electronic Deception, and C^3 Jammers. The status of each project varies. The High Power Microwave (HPM) initiative is examining the susceptibility and vulnerability of our C^3 system HPM effects. A Battle Management system is presently being defined and developed to optimize the utilization of electronic counter-measure assets for the European theater. In the Electronic Deception effort, we're working with RADC to range test several Advanced Development Models. Lastly, the C^3 Jammer project is in the process of prototyping a low power, low cost expendable jammer. The point of contact for this effort is Lieutenant Colonel John O'Malley. His phone number is (617) 271-2248.

COBRA DANE Upgrade

COBRA DANE is an L-Band phased array radar located in Shemya, Alaska. Its primary mission is collection of intelligence data regarding foreign missile testing. Some of its ancillary missions are space tracking and early warning. The problem with this system centers on its obsolete computer hardware. Additionally, beginning in 1988, COBRA DANE's Cyber 74-18 computer hardware and operating system will no longer be supported by Control Data Corporation. Our present efforts are focused on the planning and advocacy necessary to replace the antiquated hardware. Our plans call for the incorporation of recent advances in computing technology to augment the effectiveness of the COBRA

DANE radar. This program's point of contact is Mr. Orazio DiMarca. He can be reached at (617) 271-3779.

Joint Service Imagery Processing System (JSIPS)

The JSIPS is a modular, deployable computer-based softcopy exploitation system that can be tailored into specific configurations to satisfy image processing and exploitation needs for each user's operational requirement. The system will be able to receive, process, and exploit in near real-time, , inputs from national, tactical, and theater assets. JSIPS is designed to respond to the broad spectrum of tactical users today and into the future. Modularity and deployability are the hallmarks of this system. The point of contact for this effort is Lieutenant Colonel Dave Winters. He can be reached at (617) 271-8048.

FOREIGN MILIT.RY SALES

The Deputy Commander for International Programs (FA) manages acquisition programs involving command, control, communications, and intelligence systems for delivery to foreign countries. These programs are funded both jointly and solely by the United States and foreign countries. Foreign Military Sales are that portion of the United States security assistance authorized by the Foreign Assistance Act of 1961, as amended, and the Arms Export Control Act, as amended. Defense articles are furnished or sold for internal security, and legitimate self-defense. These sales also permit the recipient country to participate in regional or collective arrangements consistent with the charter of the United Nations. A purchaser nation desiring to acquire U.S. defense articles can do so either by going directly to U.S. industry or through Foreign Military Sales. In either case the sale must be approved by the U.S. government. There are several ongoing programs involving foreign military sales. They deal with the upgrade and development of Air Defense systems in Egypt, Turkey, and Bahrain.

Egyptian Air Defense Systems Upgrade

The Egyptian Air Defense System Upgrade, managed by Mr. Edward Wright, (617) 271-8536, is an ongoing program with the Arab Republic of Egypt, to provide system integration between ground-based air defense installations and their recently acquired E-2C aircraft. This program will automate diverse assets of an evolving ground-based air defense system including radars, surface-to-air missiles, and aircraft of various ages and designs obtained from both Eastern bloc and Western suppliers. This collection will be integrated with several new, fixed and tactical control systems. Off-the-shelf radars, computers, display consoles, and communication equipment will be utilized in this effort.

29

Modifications to existing off-the-shelf software will also be used. Proposals for this project will be sought in the September-November 1987 time frame. Details concerning the contract data and procurement method have not been finalized.

Turkish Air Defense System

The Turkish Air Defense System, managed by Mr. John Gautieri, (617) 271-8537, is a project in its infancy. The ultimate goal of this effort is to engineer and install air defense equipment at the soon-to-be-built Suman Air Base. The project will focus on designing base communications, negotiating the purchase of two long-range radars, and the development of an underground air operations center.

OTHER SYSTEMS

Joint Worldwide Military Command and Control Information System

This program modernizes the Worldwide Military Command and Control System which supports the Joint Chiefs of Staff, Unified/Specified Component Commands, Defense Communication Agency, and Defense Nuclear Agency. The resulting capability of the program will be improved crisis management. This modernization program will be carried out in phases over the next four years. The key phases are: procurement of the common user follow-on equipment to support the deployment of the Automated Message Handling System; an integration contract to develop the local area communication network using commercially available software; procurement of the Joint Mission Processing Equipment -- new hardware and software to replace the current Worldwide Military Command and Control System; and an enhanced automated message handling system. The expected enhancements include increased traffic requirements, conversion to government protocols, and implementation of control mode security requirements. For detailed information concerning contracting possibilities, contact Lieutenant Colonel Paul Gunville at (617) 377-5902.

Unified Local Area Network Architecture

The Air Force Base communication structure is aging and needs replacing. This fact, coupled with the demand for modern communication capabilities, has caused the Air Force to establish this program. The procurement effort will purchase commercial equipment designed to meet current industrial standards. Only a portion of the purchased equipment will have to meet certain specialized standards in order to provide for security. This purchasing program will impact all Air Force bases in the coming years. For detailed information on this program, contact Lieutenant Jim Gulvin at (617) 377-6177.

Military Airlift Command
Information Processing System
Representative Wing-Level Node

Example: Base-Level IPS
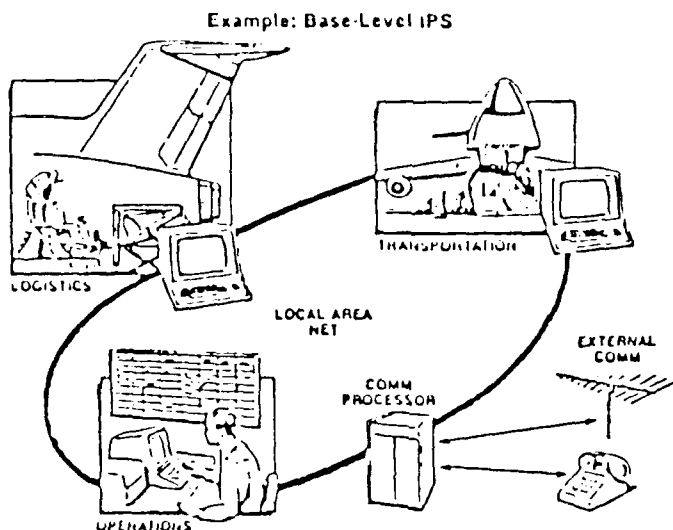
Military Airlift Command and Control
Information Processing System

Effective operation of the USAF Airlift Fleet is the goal of the Military Airlift Command and Control Information Processing System. When operational, this equipment will allow the strategic airlift schedulers to see the impact of moving a C-5 aircraft through a proposed schedule. A proposed schedule could include loading of freight at McGuire AFB, NJ; flying it to Ramstein AB, Germany; off-loading the freight; picking up a new load for Incirlik AB, Turkey; delivering it; picking up troops for a flight to Charleston AFB, SC; and finally returning to McGuire AFB. Given this itinerary, the strategic airlift scheduler could plan when to assign new flight crews to the aircraft. If nonemergency maintenance would be required for the aircraft during the mission, the question of which base should perform it, or should it be done only at McGuire, is encountered. With these new tools, the strategic airlift scheduler can efficiently manage aircraft operations, aircraft maintenance support, and

transportation of needed DoD cargos worldwide. The improved efficiency will be gained by replacing the current manual systems with the procurement of enhanced resource management tools for 31 fixed locations and 98 transportable digital communication systems. Lieutenant Colonel John Goyette, (617) 377-6465, is the point of contact for this effort.

AUTOMATED WEATHER DISTRIBUTION SYSTEM (AWDS)
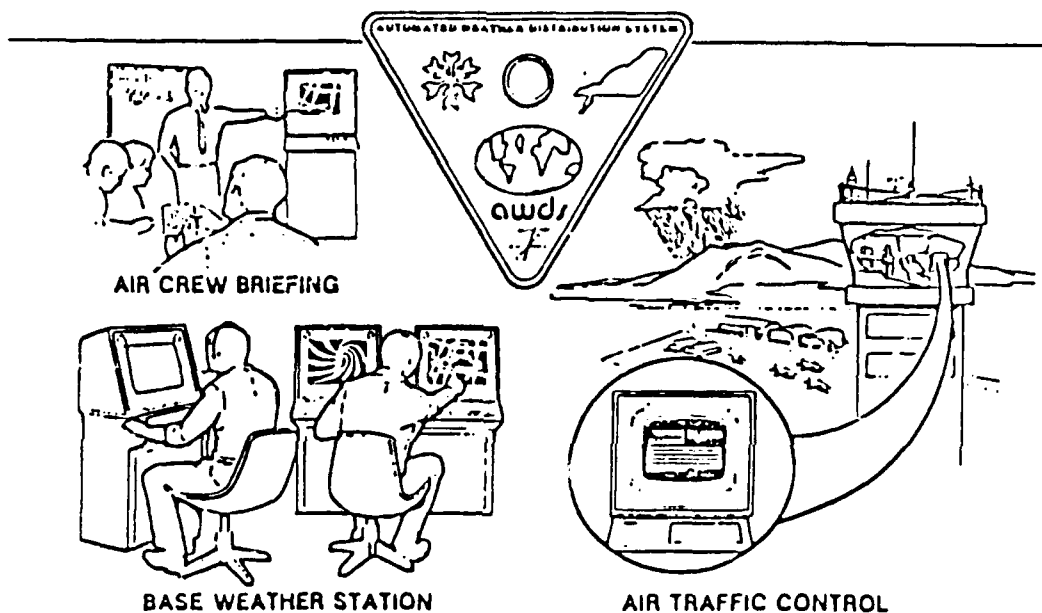
Automated Weather Distribution System

Weather information is critical to all military operations. Currently, the Air Force is limited in weather forecasting because of our manual approach to producing weather reports. This procurement program will replace the Air Force's existing manual process with a computerized color graphics system. The system will utilize the latest meteorological applications software and communication techniques. With this new capability, the accuracy and timeliness of our worldwide weather forecasting will be greatly improved. Our pilots will receive significantly improved weather briefings because of the accuracy and timeliness

33

of the meteorological information. Initially, 165 Air Force Bases will receive this capability. Also, 19 mobile weather units capable of worldwide transportability will be procured. The point of contact is Mr. Donald Turner. He can be contacted at (617) 377-6514.

AFWIS
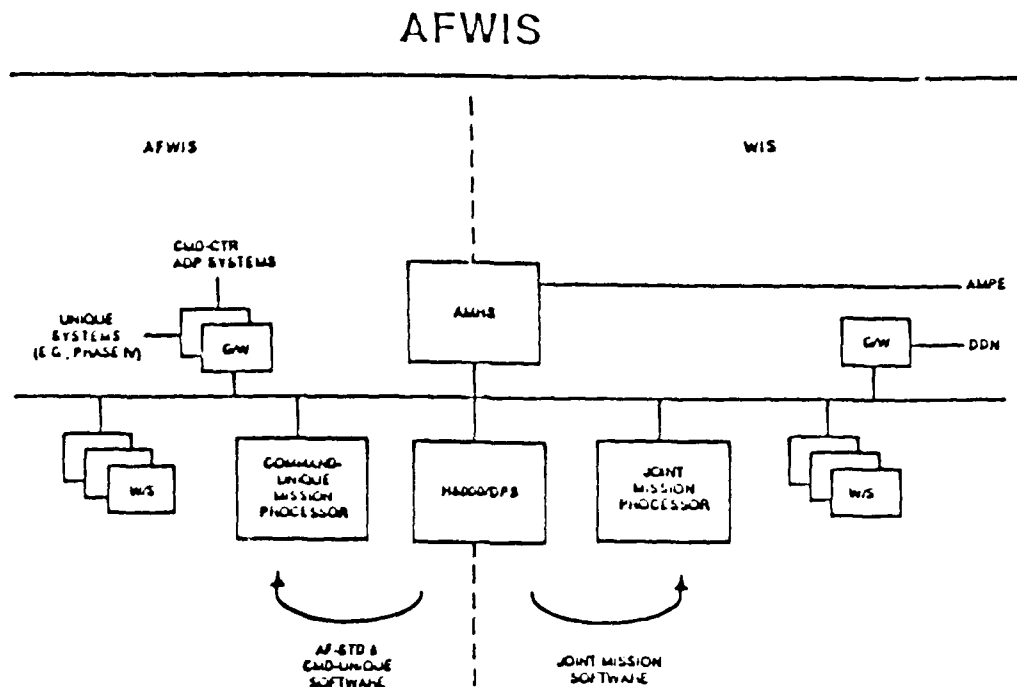
Air Force Worldwide Military Command
and Control Information System

This program addresses the unique Air Force needs which are not satisfied by the Joint Worldwide Military Command and Control Information System. The key problem this program is addressing is the incremental transition of software from the existing Honeywell computers to the new joint system. This has to be accomplished without disrupting normal Air Force operations at our key command centers. This project involves activities at over 80 Air Force locations, and when completed, will provide improved crisis management. For more information on this program, contact Lieutenant Colonel David Schafer at (617) 377-2670.

Civil Engineering Acquisition Support

ESD purchases a large number of sophisticated command and control systems. These systems generally require a new building, modification to existing facilities, or simply a concrete pad on which to install a new unit. This type of .ork is accomplished by the Deputy for Acquisition Civil Engineering. The work varies greatly depending on the project. In some cases, this office is responsible for construction of the required facility. In others, it supports the many ESD program offices with technical engineering and program management support. To accomplish this support, commercial contracts are required. The type of work required on a continuing basis includes: preparation of program plans and schedules; environmental studies and assessments; site visits and evaluations of such things as constructability, environmental and political suitability, and availability of real estate required; preparation and review of facility design; and management or surveillance of the construction project to insure compliance, timeliness, and quality. Other efforts vary from archeological surveys or soil investigation to boundary surveys. If more detailed information is required about possible civil engineering contracts, the point of contact is Colonel Arthur Kishiyama, (617) 377-3340.

Avionics Intermediate Mobile Facilities

Facility development and subsystem integration is performed under the Deputy Commander for Development Plans and Support Systems. The development of frequency converters for the Avionics Intermediate Mobile Facilities is one such program. It will provide 7.5 KVA, 15 KVA and 40 KVA, 50/60 Hz to 400 Hz frequency converters for integration into Navy standard family shelters. The frequency converters must meet rugged transportation and extreme environmental requirements.

Another integration effort is the Avionics Intermediate Shop F-15 Mobile Facility Integration. It will integrate automatic test stations, power, environmental control, and other ancillary equipment into Navy standard family shelters. It will provide intermediate level maintenance support of the F-15 aircraft.

The Avionics Intermediate Shop A-10 Mobile Facility Integration work is identical to the previous effort, the integration of subsystems into the Navy shelters. The maintenance support is for the A-10 aircraft. Lieutenant Richard Simpson, (617) 377-6429, is the point of contact for the three facility integration efforts.

TECHNOLOGY PROGRAMS

Within AFSC it is a constant struggle, especially with highly constrained dollars, to select and support the most promising technologies leading to new or significantly improved operational capabilities. Two basic methods exist for determining which new capabilities should be pursued - "Requirements Pull" or "Technology Push."

REQUIREMENTS PULL

The "Requirements Pull" process is best characterized by the annual Vanguard planning activity. Vanguard is a threat-based, user-oriented (requirements pull) analysis for documenting the using commands' needs and focusing research and acquisition activities to satisfy those needs. ESD is responsible for the preparation of eight Vanguard sub-mission plans which include:

General Purpose Forces
>   Captain Jeff Valiton - ESD/XRS (617) 377-4311

Worldwide C^2
>   Captain Guy St Sauveur - ESD/XRC (617) 377-6051

Strategic C^2
>   Captain John Mead - ESD/XRW (617) 377-6082

Atmospheric Surveillance and Warning
>   2nd Lieutenant Michael Francl - ESD/ATA (617) 377-6029

Ballistic Missile TW/AA
>   1st Lieutenant John Pistolessi - ESD/XRW (617) 377-6081

Processing, Exploitation, and Dissemination
>   Captain Mike Kelliher - ESD/ICP (617) 271-7521

C^3 Countermeasures

Mr. Manny Bliamptis - ESD/ICP (617) 271-2676

Meterology

Captain Eric Goepper - ESD/XRW (617) 377-6085

Vanguard documents the "Requirement Pull." It responds to the using commands projected requirements by focusing development planning on the most serious deficiencies the Air Force will encounter over the next two decades. The mission area plans serve two broad purposes:

o They provide for regular and formal coordination of needs and potential alternative solutions between AFSC and the operating commands.

o They identify technologies which must be matured to support future preferred systems.

- These are then provided to RADC and other laboratories for use in developing technology investment strategies.

Some of the key technology needs identified in Vanguard are listed below.

o Multi-Spectral Air Surveillance Systems
o Multi-Static Surveillance System
o Adaptive and Survivable Multi-Media Communications
o Knowledge Based Expert Systems
o Multi-Level Secure Communications
o Advanced Display Techniques
o Low Cost High Speed Computer Technology
o Ultra High Software Quality and Productivity

TECHNOLOGY PUSH

Project Forecast II

A recent AFSC study, Project Forecast II, highlighted 39 technological opportunities and 31 advanced systems concepts which offer the potential to revolutionize the way the Air Force carries out its mission in the 21st century. The following two broad areas highlight some of the key technologies and advanced system concepts important to ESD system development/acquisition.

Electronics and Optics
Electronics and optics provide the technological underpinning for virtually all Air Force systems. Four technologies are of particular importance to ESD. First, the goal is to substitute photonic devices for electronic devices wherever feasible to defeat electromagnetic pulse (EMP), radiation, and electronic warfare threats. The goal is to produce systems -- like strategic or tactical battle management systems -- that employ photons instead of electrons to sense, compute, process, and transmit signals.

Second is the development of fail-soft, fault-tolerant systems. The potential to share hardware and software in a variety of systems under an artificial intelligence "manager" will result in significant improvements in reliability, maintainability, and supportability. New generations of multipurpose computers and signal processors will permit us to share functions and data in a way that will overcome the effects of battle damage or electronic failure - either of which would result in loss of capability in current systems.

Third, the Air Force needs to build aircraft with "smart skins" - outer skins containing embedded phase arrays to permit the

aircraft to sense and communicate in optical and other frequency bands, and in any direction from any aircraft altitude. Again, these capabilities are remarkably survivable to all but catastrophic damage to the aircraft. Smart Skin should also enhance stealth by allowing the elimination of pods and domes on aircraft, and provide an almost unlimited number of paths for signals to control surface actuators, greatly enhancing the aircraft's survivability.

Fourth, the Air Force needs to develop multi-spectral and multi-static surveillance systems. Multi-spectral surveillance systems will take advantage of a wide range of target signatures to provide positive detection, tracking and identification of all airborne targets. These systems will possibly incorporate active radar, infrared, advanced optics, acoustic, millimeter wave, and electronic support measures (ESM). Multi-static surveillance systems will allow passive surveillance of enemy targets through the use of bistatic radar technology. This concept also allows for the possible use of non-cooperative transmitters, providing an additional measure of flexibility and covertness.

Information, Computation, and Displays

The United States leads the world in the technical areas of information, computation, and displays, and these technologies are critical to the ESD mission area. Forecast II saw the need for a great expansion in the application of artificial intelligence (AI), especially knowledge-based expert systems. Such systems will be critical in situations where large quantities of information are being managed, such as battle management, sensor processing/fusion, and training. One extremely important area is the preservation of very large data bases and functions, such as the strategic warning, attack assessment and strike management systems. Large distributed computer systems which

40

support all required functions, thus eliminating critical nodes, will ensure the system's overall survivability.

Another area of paramount interest is man-machine interactions. The Air Force needs advanced battle management work stations which respond reliably to voice commands, eye motion signals, and simple touch without the requirement for complicated key input devices. Also, there will be more emphasis placed on virtual displays, especially in situations where all-source sensor information can be fused and translated into natural displays to facilitate rapid, well-informed decision making.

Finally, the need exists for survivable, multi-media communications networks which distribute the required intelligence and operational information in real-time to all users. These systems will employ "smart" controllers which select not only the best path, but also the best communications media from among line-of-sight, beyond line-of-sight, or satellite resources. In addition, the communications network must allow for graceful degradation and continue to operate in the face of severe jamming. Finally, the system must support multi-level secure communications among the various users.

ESD is the Office of Prime Responsbility (OPR) for three of the Forecast II advanced system concepts which are described below.

MULTISTATIC SURVEILLANCE SYSTEM (PS-33)

The multistatic surveillance system involves the development of a bistatic radar responsive to the full spectrum of Air Force mission requirements including surveillance, reconnaissance, and strike. The primary advantage of this technology is the ability to design surveillance platforms which don't radiate and are therefore, much harder for the enemy to locate. This

is accomplished by the physical separation of the transmitter and the receiver, which operates in a passive mode. The concept also allows for the possible use of non-cooperative transmitters providing an additional measure of flexibility and covertness. Project manager is Captain Tom Grycewicz at (617) 377-6619.

THEATER AIR WARFARE C³I (PS-39)

The objective of this Forecast II initiative is to develop and demonstrate a fully distributed theater force management system which allows for flexible deployment, ensures interoperability among the dispersed elements, and is survivable. The system will be highly adaptive and permit continued operation by incorporating common control elements, a fully distributed information processing network and a survivable multi-media information exchange network. The system will also feature advanced man-machine interfaces and displays, and employ automated decision aids to permit rapid assessment of enemy actions/intentions and development of friendly courses of action. Project manager is Captain Philip Roberts at (617) 377-6006.

ARTIFICIAL IONOSPHERIC MIRROR (PS-45)

The objective of this Forecast II initiative is to assess the feasibility of creating and using artificial ionospheric mirrors to improve beyond line-of-sight surveillance and communications capabilities. An artificial ionospheric mirror is a man-made patch of ionization, created in the atmosphere and located below the natural ionosphere, to support over-the-horizon transmission and receipt of radio signals. Several technical issues need to be investigated to include: prime and RF power requirements; environmental/safety implications; military utility; and feasibility of creating, maintaining, and controlling large ionization patches. Project manager is Lieutenant Colonel Bill Lana at (617) 377-6313.

In addition to the above Project Forecast II initiatives at ESD, RADC is the OPR for the following Forecast II technologies and advanced system concepts.

- o   Advanced Deception (PT-06)
- o   Acoustic Charge Transport (PT-09)
- o   Photonics (PT-11)
- o   Survivable Communications Network (PT-14)
- o   Adaptive Control of Ultra-Large Arrays (PT-15)
- o   Smart Built-In Test (PT-33)
- o   Knowledge Based Systems (PT-36)
- o   Ultra-High Software Quality and Productivity (PT-43)
- o   Low Cost High Speed Military Computer Technology (PT-48)
- o   Airborne Surveillance System (PS-35)
- o   Battle Management Processing Display Systems (PS-48)

DOD SOFTWARE ENGINEERING INSTITUTE (SEI)

The SEI was chartered to accelerate the transition of evolving software technology into computer-intensive weapon systems. Carnegie Mellon University manages the SEI as a Federally Funded Research and Development Center. Affiliate programs have been established with over 40 major companies and with ten universities. Seven major technical thrusts have been approved in the SEI five year plan. These address future software engineering systems, technology assessment, software reuse, Ada transition and dissemination of software engineering know-how through the SEI software showcase, through elimination of obstacles to necessary technology transition, and through software engineering education. Colonel Jackson Ferguson, (617) 377-2639, is the project manager.

COMPUTER RESOURCE MANAGEMENT TECHNOLOGY (CRMT) PROGRAM

This engineering development program addresses the many and

varied problems associated with the acquisition, development, and support of mission critical computer resources within Air Force weapon systems. The program goal is to apply technology to the system acquisition and support process, to reduce software life cycle cost, and to improve the quality of weapon system software. Program emphasis is on the transition of advanced computer technology from laboratories, industry, and academia into operational use. Efforts planned address: the use and control of high order languages; management and engineering approaches to computer software development; the use of requirements cost analysis; the application of comprehensive acquisition management procedures; research and developments for Air Force multi-level computer security, and the development of an information network that links existing and planned logistics/engineering systems into a totally integrated architecture. The project manager is Major Charles Ryan at (617) 377-2719.

KNOWLEDGE-BASED TECHNOLOGY

Two programs are currently investigating the feasibility of applying knowledge-based expert system technology in the area of strategic command and control. The first project involves development of an expert system to assist HQ MAC deployment airlift planners during the development of deliberate and crisis airlift plans. The system will significantly reduce both the manpower and time required to generate a complex airlift deployment plan. It will also allow the rapid examination of alternative options, resulting in the selection of an optimum or near-optimum plan. The second project involves the development of an expert system aid to support SPACECOM'S satellite range scheduling requirements. The project manager is Lieutenant Joe Besselman at (617) 377-6075.

PROGRAM INDEX